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A SHOCK ABSORBING DEVICE FOR A SHOE

Abstract:

According to the invention there is provided a shock-absorbing device for an article of footwear. The device includes a frame having a heel supporting region for supporting a heel portion of the article of footwear, and a ball supporting region for supporting a ball portion of the article of footwear. The heel supporting region includes a pair of cushioned soles each having a tread that is arcuate in shape, and the ball supporting region also includes a pair of cushioned soles each having a tread that it arcuate in shape. The arcuate shape of the treads allow movement of air within the cushions, to properly cushion a user's walk.

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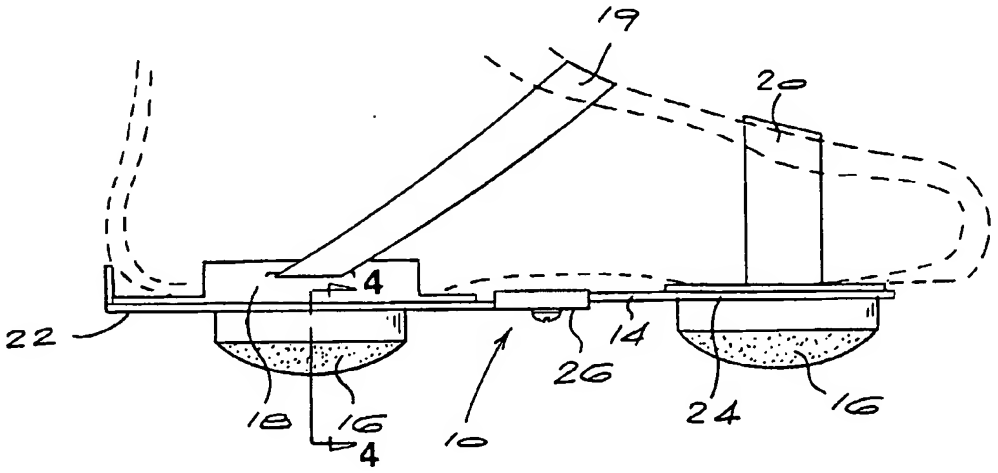
(54) Title: A SHOCK ABSORBING DEVICE FOR A SHOE




(57) Abstract: According to the invention there is provided a shock-absorbing device for an article of footwear. The device includes a frame having a heel supporting region for supporting a heel portion of the article of footwear, and a ball supporting region for supporting a ball portion of the article of footwear. The heel supporting region includes a pair of cushioned soles each having a tread that is arcuate in shape, and the ball supporting region also includes a pair of cushioned soles each having a tread that it arcuate in shape. The arcuate shape of the treads allow movement of air within the cushions, to properly cushion a user's walk.

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# A SHOCK ABSORBING DEVICE FOR A SHOE

## BACKGROUND OF THE INVENTION

THIS invention relates to a shock-absorbing device for an article of footwear, such as a shoe.

## SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided a shock-absorbing device for an article of footwear, the device including a frame having:

a) a heel supporting region for supporting a heel portion of the article of footwear, and a ball supporting region for supporting a ball portion of the article of footwear; and

b) a first cushioned sole located at the heel supporting region of the frame, and a second cushioned sole located at the ball region of the frame.

Advantageously, the frame is adjustable so that the distance between the heel supporting and ball supporting regions may be varied.

Preferably, the frame is rigid.

Advantageously, each cushioned sole has a tread that is arcuate in shape.

Conveniently, the heel and ball supporting regions of the frame each include a pair of pneumatically cushioned soles with arcuate treads.

Advantageously, the cushioned soles are removable from the frame and are in the form of inserts.

Conveniently, the device is releasably attachable to the article of footwear.

According to a second aspect of the invention there is provided a shock-absorbing device for an article of footwear, the device including a frame for

attachment to a heel region of the article of footwear, the frame including a pair of cushioned soles each having a tread which is arcuate in shape.

The invention also relates to a frame for attachment to a ball portion of an article of footwear, the frame including a pair of cushioned soles, each having treads which are arcuate in shape.

## BRIEF DESCRIPTION OF THE DRAWINGS

**Figure 1** is a side view of a shock-absorbing device according to a first embodiment of the invention;

**Figure 2** is a bottom view of Figure 1;

**Figure 3** is a pictorial view of a cushioned insert for the shock-absorbing device shown in Figure 1;

**Figure 4** is a cross-sectional view on the line 4 - 4in the device of Figure 1;

**Figure 5** is a pictorial view of a bracket for attaching the device shown in Figure 1 to the shoe of a user; and

**Figure 6** is a side view of a shock-absorbing device according to a second embodiment of the invention.

## DESCRIPTION OF EMBODIMENTS

Referring to Figures 1and 2, a shock-absorbing device 10 is provided for supporting an article of footwear such as shoe 12 (shown in dotted outline together with a foot in the shoe in Figure 1).

The shock-absorbing device 10 comprises a rigid frame 14, which supports cushion inserts 16, a bracket 18 and first and second straps 19 and 20 for attaching the shock-absorbing device 10 to the shoe 12. The frame 14 may be made from aluminium or kevlar re-inforced fiberglass, or any other lightweight rigid material. The cushion inserts 16 fit into receptacles 21 in the frame 14.

The frame 14 includes two support regions 22 and 24. The support region 22 is for supporting the heel of the foot of a person using the device 10 and the support region 24 is for supporting the ball of the foot of a person using the device 10. Thus, the support region 22 is termed the "heel support region" and the support region 24 is termed the "ball support region". The support regions 22 and 24 are joined by an adjustable neck region 26. The length of the neck region 26 may be adjusted to adjust the spacing between the inserts 16 on the support regions 22 and 24.

Referring to Figure 3, each insert 16 is hollow and is made from rubber. The insert 16 has an arcuate tread 32 and a groove 34, extending around the insert. The insert 16 is hollow, and thus has a hollow cavity 35. The hollow cavity 35 may be left hollow, or it may contain a spongy material, or it may receive a bladder, which may be inflated by air. A pair of inserts 16 is arranged to support the heel or ball of the foot of a user, and each is about 6 to 8, preferably 7cm in length, and 2 to 4, preferably 3 cm in width.

Referring to Figure 4, the insert 16 is designed to fit into a receptacle 28 on the device 10. A projection 34 extends from the inner wall of the receptacle 28 into the groove 34 of the insert 16, to lock the insert 16 within the receptacle 28. In the case where a bladder is provided within the cavity 35, the bladder may be inflated via a valve which extends through a hole in the insert 16, to a pressure of 2 to 10 bar, but will usually be in the region of 2 bar. The insert 16 is locked within the housing, when inflated. If an insert 16 is punctured, it may be replaced with a new insert, or the insert may be repaid. Further, the inserts 16 are oriented in the frame 16, so that the arcs defined by the arcuate shapes of the treats 34 of the inserts 34 are parallel with an axis "a" running through the frame 14.

Referring to Figure 5, a bracket 18 for attaching the device 10 to the shoe of a user (not shown) includes a base portion 38 which is attached, or attachable to the heel support region 22 on the frame 14 of the device 10 shown in Figure 1. The base region 38 is arranged to receive and support the sole of the shoe shown in Figure 1. The bracket 18 includes an adjustable rear wall 40 which is arranged to abut with the back of the heel of a shoe, and adjustable side walls 42 and 44 which are arranged to abut with and engage with the side portions of the heel of a shoe. A strap 19 which comprises a first strap 19a having hook material and a second strap 19b having loop material is provided for strapping the bracket 18 to the heel portion of a shoe.

Referring to Figures 1 and 2, the inserts 16 are arranged to form a first pair at the heel support region 22 which supports the heel of a foot of a user, and a second pair at the ball support region 24 which supports the ball of the foot of a user. The adjustability of the neck region 26 of the frame 14, allows the device 10 to be adjusted for different size feet and shoes 12. The positioning of the insert 16 under the heel and the ball of a foot of a user is important. During walking, the heel of the foot supports the weight of the body when the ball of the foot is off the ground, and the ball of the foot supports the weight of the

body when the heel is off the ground. Thus, the device 10 provides cushioning at the crucial parts of the foot during walking. The rigid frame 14 is also important to support the shoe and foot and provide a comfortable walk. It is also important that the inserts are arcuate in shape to provide proper cushioning during walking. The arcuate shape allows the movement of air within the bladders of the inserts 16, to properly cushion a user's walk.

Although the device 10 according to the invention is shown with the heel support region 22 and ball support region 24 connected by a neck region 26, it is also possible to have separate heel and ball support regions 22 and 24 which are shown in Figure 6. A user may elect to use only the heel support region 22. The separate heel and ball support region are very similar to the device described above in Figure 1, except the supports are not connected, and thus work in much the same way.

## CLAIMS

1. A shock-absorbing device for an article of footwear, the device including a frame having:

   a) a heel supporting region for supporting a heel portion of the article of footwear, and a ball supporting region for supporting a ball portion of the article of footwear; and

   b) a first cushioned sole located at the heel supporting region of the frame, and a second cushioned sole located at the ball region of the frame.

2. A device according to claim 1, wherein the frame is adjustable so that the distance between the heel supporting and ball supporting regions may be varied.

3. A device according to claim 1 or 2, wherein the frame is rigid.

4. A device according to any one of the preceding claims, wherein each cushioned sole has a tread that is arcuate in shape.

5. A device according to claim 4, wherein heel and ball supporting regions of the frame each include a pair of cushioned soles with arcuate treads.

6. A device according to any one of the preceding claims, wherein the cushioned soles are removable from the frame and are in the form of inserts.

7. A device according to any one of the preceding claims, which is releasably attachable to the article of footwear.

8. A shock-absorbing device for an article of footwear, the device including a frame for attachment to a heel region of the article of footwear, the frame including a pair of cushioned soles each having a tread which is arcuate in shape.

9. A shock-absorbing device for an article of footwear, the device including a frame for attachment to a ball region of the article of footwear, the frame including a pair of cushioned soles, each having a tread which is arcuate in shape.

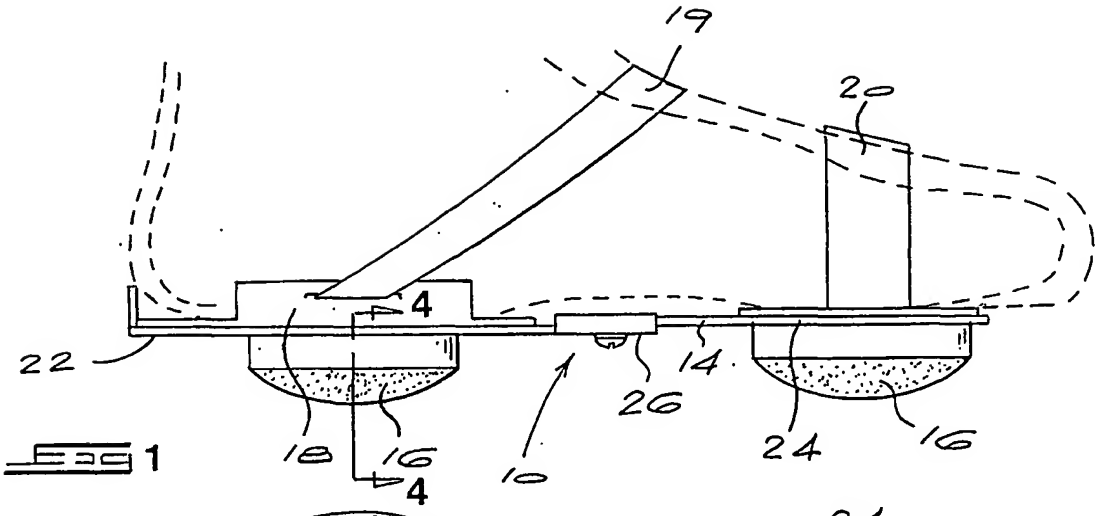



Fig 1

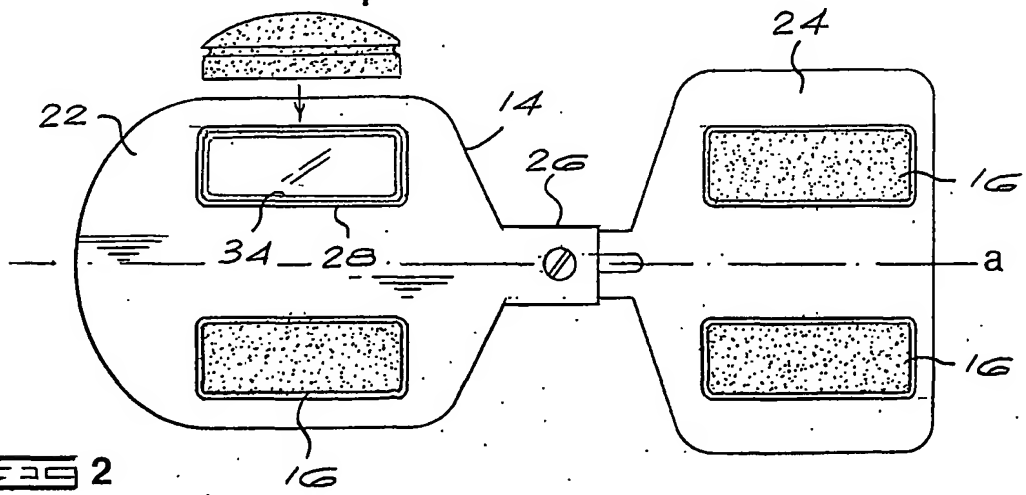



Fig 2

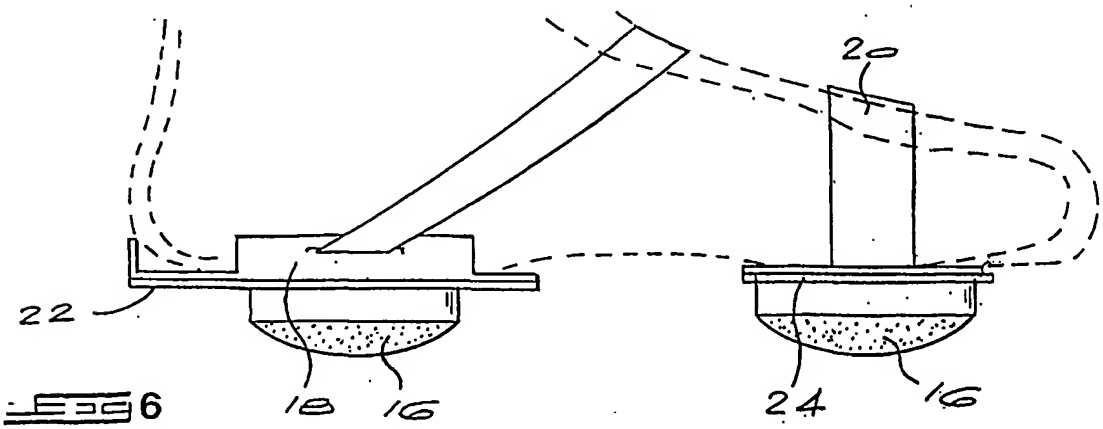



Fig 6

Fig 3

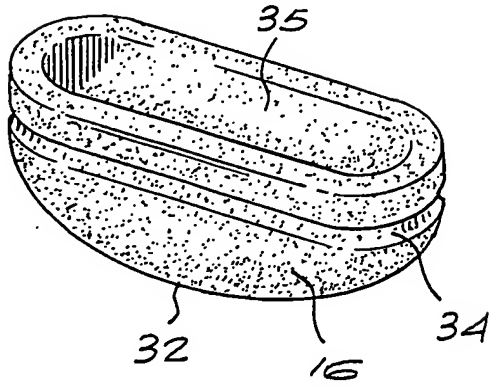
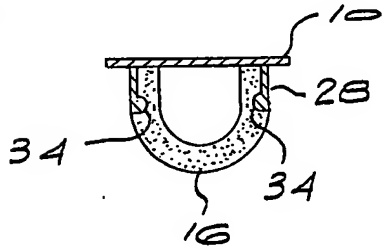



Fig 4



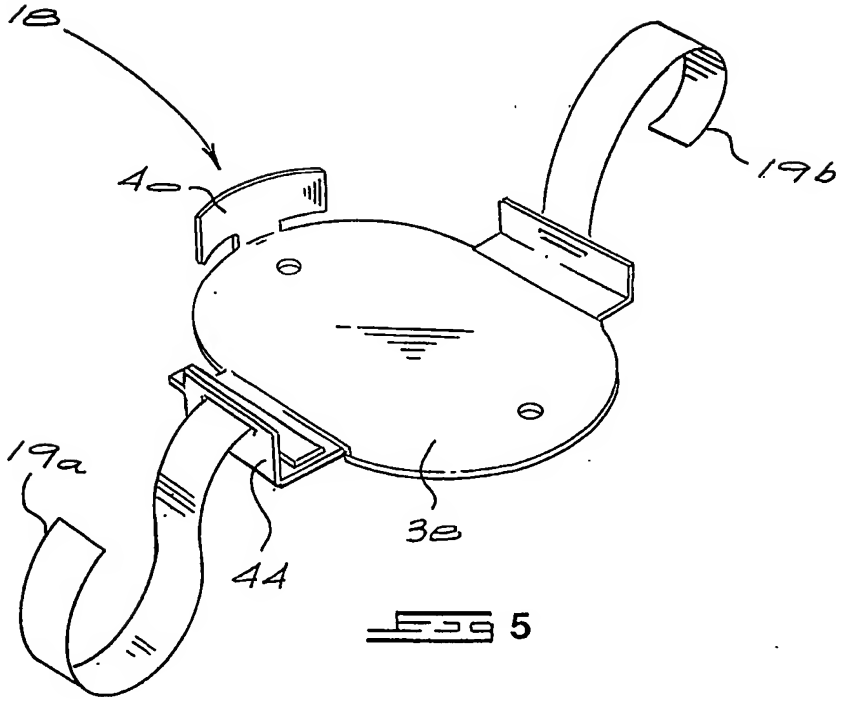




Fig 5

# INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A43B13/18 A43B3/16 A43B5/18 A63B25/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
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| X | NL 8 502 659 A (MATHEUS HUBERTUS GERARDUS KIER) 16 April 1987 (1987-04-16) claims 1,11 page 5 | 1,7,8 |
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| Y | the whole document | 8,9 |
| Y | US 4 774 776 A (GULLI FRANK) 4 October 1988 (1988-10-04) the whole document | 8,9 |

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 15 March 2002 | 26/03/2002 |

| Name and mailing address of the ISA | Authorized officer |
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| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31–70) 340–2040, Tx. 31 651 epo nl,<br>Fax: (+31–70) 340–3016 | Claudel, B |

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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[redacted]tion on patent family members

Intern[redacted]l Application No
PCT/[redacted]1/02116

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